**Objectives**

Upon completion of this activity, you will be able to:

* Identify the 8 causal principles that will guide the activities in this class
* Match the causal principle to scenarios about the Earth and environmental processes

**Causal Principles**

In this course we will use the casual principles underlying scientific processes or phenomena in order to learn about global change. Each activity will focus on a few of the causal principles.

1. Gravitational energy, thermal energy and/or chemical **energy** drive all movement and change of matter on Earth.
2. A system is in **equilibrium** when energy in the system is balanced.
3. Matter moves and changes to return a system to **equilibrium**.
4. **Energy** is needed to break bonds and is released when bonds form.
5. **Temperature** is a measure of the movement of molecules. Higher temperature means molecules are moving faster.
6. When molecules move faster, the **density** of most substances decreases. Water is an anomaly because liquid water is more dense than ice.
7. **Buoyancy** causes materials to rise or fall due to the relative density of materials.
8. **Feedback loops** can accelerate, decelerate or dampen change.

**PART 1: Background Notes**

In this section you should take any notes that seem important during the introductory powerpoint. The powerpoint will review the main scientific ideas in the activity.

**Part 2: Group Work**

Work in your groups and try to identify which causal principles relate to each of the following scenarios. There can be more than one causal principle assigned to each.

1. You make cup of tea, and the phone rings. When you return to your cup of tea it has gotten cold.
2. Your friend’s birthday is coming up and you buy her some balloons. The balloons are filled with helium so they float. It’s February in East Lansing and therefore it’s cold outside. As you bring the balloons to your car, they appear to deflate and are hanging a little lower in the air.
3. You climb a tree and knock an apple off of a branch.
4. In the morning, before the sun rises, the temperature is the coldest it is all night long. Sometimes dew forms on the grass. When the dew forms the temperature rises just a bit even though the sun has not risen to warm the atmosphere.